07 20 00 • BUILDING INSULATION

SECTION INCLUDES

Batt Insulation
Insulating Sheathing
Rigid Insulation
Blown-In Loose Fill Insulation
Blown-In Foam Insulation
Vapor Retarder
Air Sealing
Sill Sealer

RELATED SECTIONS

03 30 00	Concrete
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QUALITY AND TESTING STANDARDS & REFERENCES

ASTM C578	Specification for Extruded Polystrene Insulation Board
ASTM C1289-02	Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board
ASTM C1303	Standard Test Method for Estimating the Long-Term Change in Thermal Resistance of Unfaced Rigid Closed Cell Plastic Foams Under Controlled Laboratory Conditions (1995)
ASTM C1149	Standard Specification for Self-Supported Spray Applied Cellulosic Thermal Insualtion
FTC 16 CFR 460	Labeling and Advertising of Home Insulation: Trade Regulation Rule (2005)
LTTR	Long Term Thermal Resistance, based on ASTM C1303 Current industry standard for rating rigid insulation's thermal performance, (replaces PIMA 101)

INSULATION

GENERAL SELECTION GUIDELINES

Choose insulation using the following standards in unison with curent market costs because prices fluctuate widely between insulation types from year to year and the industry is constantly evolving to produce new, safer and more cost-effective products.

Do not specify products containing formaldehyde or CFC/HCFC blowing agents.

Check the manufacturer's data before specifying insulation, as many of the traditional formulations of rigid insulation have recently changed to phase out the use of these ozone depleting chemicals in manufacturing.

Use aged insulation values when designing and calculating the insulation's thermal value in assemblies and to meet MA Energy Code requirements.

FIBERGLASS BATT INSULATION

DESIGN

Specify and detail insulation at rim joists and chases at exterior walls. Fully insulate at rim joists.

When there are existing water pipes running through attics, use batts to provide an insulation tent whereby pipes are fully covered with insulation and exposed to ceiling drywall below which will allow conditioned air to reach the pipes. See the detail.

Fiberglass batt insulation has traditionally been one of the most cost-effective options, however particular attention should be given to adequate sealing of building envelope where fiberglass batt inuslation is used.

Do not use this material to seal around window openings, outlets or exterior wall penetrations; use low expansion foam instead.

Do not use fiberglass in bathroom floor joists where bathrooms are located over unheated crawl spaces, basements or porches. Use rigid insulation.

INSULATING SHEATHING

MATERIALS

Extruded polystyrene products with compressive strengths of 25 psi minimum, are recommended because of their low water absorption, and stable insulating value over time.

Expanded polystyrene and foam products are not recommended.

Use tongue & groove foam board in order to prevent gaps and air infiltration.

DESIGN

Insulate interior access hatches to attics with layers of rigid insulation in conjunction with weatherstripping to create a well sealed and insulated opening. Follow Energy Star guidelines, available at www.energystar.gov.

For slab-on-grade and crawl space foundations, perimeter insulation should extend down at least 4 feet from grade.
For basement foundations, perimeter insulation should extend all the way down to the top of the footing to help keep it in place during backfill. Insulation can be anchored higher up on the wall with a construction adhesive specifically formulated for adhering extruded polystyrene.

Use 2" rigid insulation, min. 25 psi under the entire slab in basements which potentially may be occupied in the future or for slab-on-grade multi-family residential construction. Consider ship-lapped or tongue and groove insulation during design, if it is available and cost-effective at the time of construction.

Interior foundation insulation is prefered. Where exterior foundation insulation must be used, cover exterior exposed portions of the foundation insulation with a reinforced cement board or rigid fiberglass reinforced plastic protection board (such as Glasbord by Kemlite Company Inc).

For very large exposed areas of foundations insulation, consider providing strapping and covering with siding.

Waterproofing rigid insulation board with grooves cut into it that channel water toward drain lines (such as Thermadry by Dow) may be used at basements in lieu of, or in addition to, drainage fill.

EXECUTION

Insulating sheathing should be installed continuous without penetrations by blocking, furring strips or framing members. For best thermal performance, it is preferred that insulation extend up to the rough opening of windows and that low expansion foam be used to seal at the perimeter of windows

RIGID INSULATION FOR LOW-SLOPE ROOFS

MATERIALS

Specify only rigid insulation that is approved by the roofing membrane manufacturer

Extruded polystyrene rigid insulation is preferred for flat roofs; polyisocyanurate is acceptable when it is part of the manufacturer's roofing system. Avoid expanded polystyrene because it is easily damaged.

DESIGN

Tapered insulation is required where framing does not provide positive drainage pitch.

Insulation used with built-up roofing must have a layer of fiberboard or other material that will absorb water vapor, otherwise blistering will occur.

EXECUTION

When using two layers of insulation, stagger the joints to avoid a through seam.

BLOWN IN LOOSE FILL

DESIGN

Cellulose, Rock Wool, or Slag-Wool are all acceptable choices for blown in Insulation. The Designer should specify the most cost effective choice based on local availability.

If wet-blown cellulose is specified besure the specifications require ample drying time; minimum 3 days in the construction schedule and additional time if climatic conditions require or higher amounts of water than 1.5 lbs. per bag, are used in the installation.

If cellulose is used, specify baffles or some method for holding down insulation in areas of potential high velocity air movement, such as adjacent to gable vents and also provide rigid insulation hatch covers for all moveable portions of attic floor, such as stairs and access hatches.

If cellulose is specified which contains ammonium sulfate fire-retardant require the insulation to be isolated from metals and pipes, particularly in wet-spray applications, due to corrosive effects of chemicals in insulation with metal.

At the perimeter of attics, the full depth of blown-in insulation should cover the top plate but should not extend out beyond into the unheated eave space; about 12 inches clear is needed to allow for fulll insulation. This requires use of raised heel trusses unless the roof pitch is about 8 in 12. Blown in insulation is suseptible to being blown around in the attic space - leaving areas uninsulated, in some instances pipes can be left unprotected if special provisions are not taken to prevent such insulation drifting.

To ensure adequate attic ventilation, provide a baffle or other means for a channel for air flow from the soffit vent to the ridge vent. (see illustration).

Combine fiberglass batts with blown-in insulation to provide an insulation tent for water pipes that are run through attics (see illustration).

BLOWN IN URETHANE FOAM

DESIGN

Urethane/Icynene Foams are among the most durable insulation materials, have excellent bonding characeristics and ability to fill cracks and crevices, and may be cost-effective where these particular attributes are required or for hard to access cavities and crevices..

Evaluate product availability and cost prior to specifying, choose ASTM C1303-rated products with low thermal drift and which do not employ HCFC blowing agents. Some of these product may not be cost effective on moderniation applications because of the high cost of mobilization.

VAPOR BARRIER

EXECUTION

Air seal floor of attic before insulation is added.

Use flags (witness stakes) to determine the depth of cellulose as it is blown in.

MATERIALS

Vapor retarder: 6 mil polyethylene or 4 mil reinforced polyethylene (such as Tu-Tuf 4 by Sto-Cote Products, Rufco 300&400 by Americover, or Teno-Arm by SKANDA.

EXECUTION

All seams should be overlapped 6 to 8 inches and sealed with the manufacturer's tape. Seal all penetrations and tears.

AIR SEALING

MATERIALS

Acceptable materials include:

- ❑ Foamed in place polyurethane:1.5 to 1.75 lb. per cubic foot density
- ❑ Acoustic sealant
- ❑ Icynene

DESIGN

Foamed in place low-expansion polyurethane, acoustic sealant, or gasketing is required around windows, doors, ducts, and all other building envelope penetrations including pipes, wiring, tops of chase walls, flues, access panels, elevator shafts, etc.

EXECUTION

Installation of low-expansion foam should be sufficient to fill void with out causing window or door operation problems by overfilling.

SILL SEALER

MATERIALS

Provide a non-water absorbing sealant between the foundation and sill such as Ethafoam by Dow Chemical USA. Seal rim joist penetrations prior to insulating.

FIRESTOP SEALANTS

MATERIALS

Install only sealants rated for high-temperatures around furnace flues or chimney penetrations in attics. Do not use spray foam.

Consider building flashing shrouds around metal furnace and water heater flues which will provide a minimum of 1" separation between inner flue and outer flue, while sealing air penetrations and allowing insulation to be placed around the outer flue.